

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 23513

CSAH NO. 36

OVER THE

ROOT RIVER

DISTRICT 6 - FILLMORE COUNTY

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PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 148)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 23513, Piers 1 through 4, were found to be in good condition with no defects of structural significance observed. Local scour was observed at Piers 1 through 3 with the footing exposed at Pier 1. The maximum vertical face exposure of the footing was 3.2 feet at Pier 1 with no undermining present. A minor accumulation of timber debris was observed at Piers 2 and 3. The channel bottom appeared stable with only minor local scour at the piers and no appreciable changes since the previous inspection, aside for some minor channel degradation between Piers 2 and 3.

INSPECTION FINDINGS:

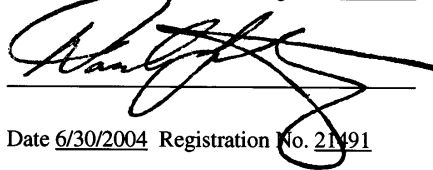
- (A) A minor scour depression was observed at the upstream end of Pier 1 measuring 2 foot deep and 6 feet in radius. The footing was exposed around the entire perimeter of Pier 1, with a maximum vertical face exposure of 3.2 feet at the upstream end and with no undermining detected.
- (B) A minor scour depression was observed at the upstream nose of Pier 2 and measured approximately 3 feet in radius and 1 foot deep with no footing exposure observed.
- (C) A minor scour depression was observed at the upstream nose of Pier 3 and measured 0.5 feet deep by approximately 2 feet in radius with no footing exposure observed.
- (D) An 18 inch diameter log was observed across the upstream nose of Pier 2 and a light accumulation of branchy timber debris was observed along the east face and downstream nose of Pier 3.

RECOMMENDATIONS:

- (A) Monitor the timber debris at Piers 2 and 3, and if found to be increasing in the future, removal operations may become warranted.
- (B) Since scour screening indicated that bridge is at low risk for scour, only monitor the footing exposure and extent of scour during future inspections.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

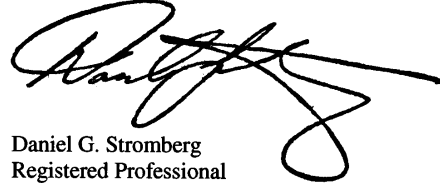
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

\_\_\_\_\_  
Daniel G. Stromberg

  
Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 23513

Feature Crossed: The Root River

Feature Carried: CSAH No. 36

Location: District 6 - Fillmore County

Bridge Description: The bridge superstructure consists of a five span, multiple prestressed concrete girder structure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and four reinforced concrete piers. The piers are supported on untreated timber piles and the abutments are supported on treated timber piles. The piers are numbered 1 through 4 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Clayton G. Brookins, Michelle D. Koerbel

Date: October 3, 2002

Weather Conditions: Cloudy,  $\pm 50^{\circ}$  F

Underwater Visibility:  $\pm 3$  Feet

Waterway Velocity:  $\pm 1.5$  f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 4.

General Shape: The piers each consist of an oblong rectangular shaft with rounded ends supporting a hammerhead pier cap. The piers are supported by a rectangular footing founded on timber piles.

Maximum Water Depth at Substructure Inspected: Approximately 6 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Pier 1.

Water Surface: The waterline was approximately 18.8 feet below reference.  
Waterline Elevation = 772.2.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 8

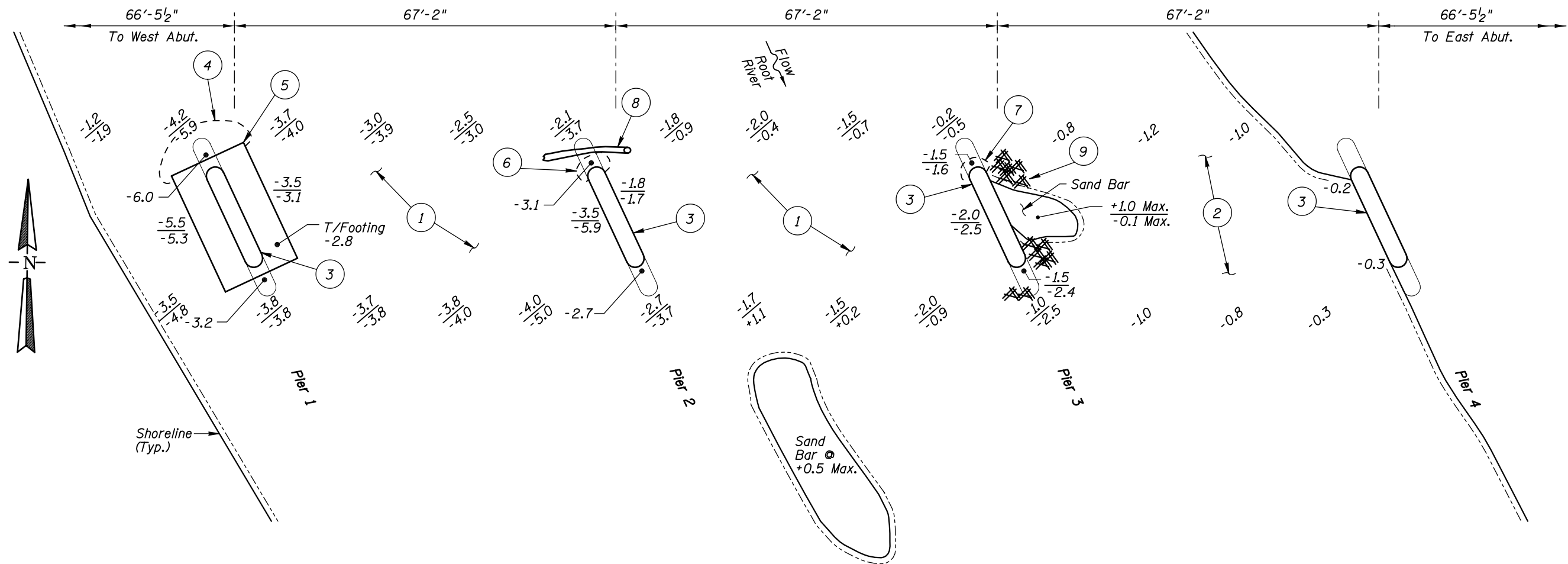
Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/10/02

Item 113: Scour Critical Bridges: Code I/92

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

\_\_\_\_\_ Yes   X   No



**SOUNDING PLAN**

**INSPECTION NOTES:**

- 1 The channel bottom material consisted of firm silty sand with gravel and scattered 5 inch diameter cobbles with maximum probe rod penetrations of 2 to 4 inches.
- 2 The channel bottom material consisted of soft silt over gravel with a maximum probe rod penetration of 6 inches.
- 3 The concrete of the piers was in good and sound condition with no significant deterioration.
- 4 A scour depression, 2 foot deep and 6 feet in radius, was observed at the upstream nose of the pier.
- 5 The top of the footing was exposed around the entire pier with up to 3.2 feet of vertical footing exposure at the upstream end of the pier with no undermining observed.
- 6 A scour depression, 1 foot deep and 3 feet in radius, was observed at the upstream nose of the pier.
- 7 A scour depression, 6 inches deep and 2 feet in radius, was observed at the upstream nose of the pier.
- 8 An 18 inch diameter log was observed across the upstream nose of the pier.
- 9 A light accumulation of branchy timber debris was observed along the east face and downstream nose of Pier 3.

**GENERAL NOTES:**

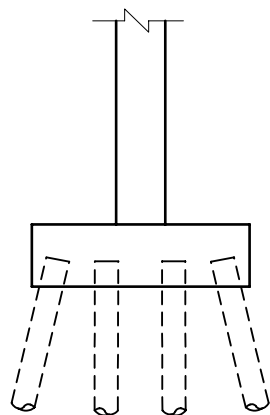
- 1 Piers 1, 2, 3, and 4 were inspected underwater.
- 2 At the time of inspection on October 3, 2002 the waterline was located approximately 18.8 feet below the top of the pier cap at the upstream end of Pier 1. This corresponds to a waterline elevation of 772.2 based on the previous report dated September 29, 1997.
- 3 Soundings indicate the water depth at the time of inspection and are measured in feet.
- 4 Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

**Legend**

-3.8 Sounding Depth from Waterline (10/3/02)  
-3.8 Sounding Depth from Waterline (9/29/97)

Timber Debris

Scour Depression



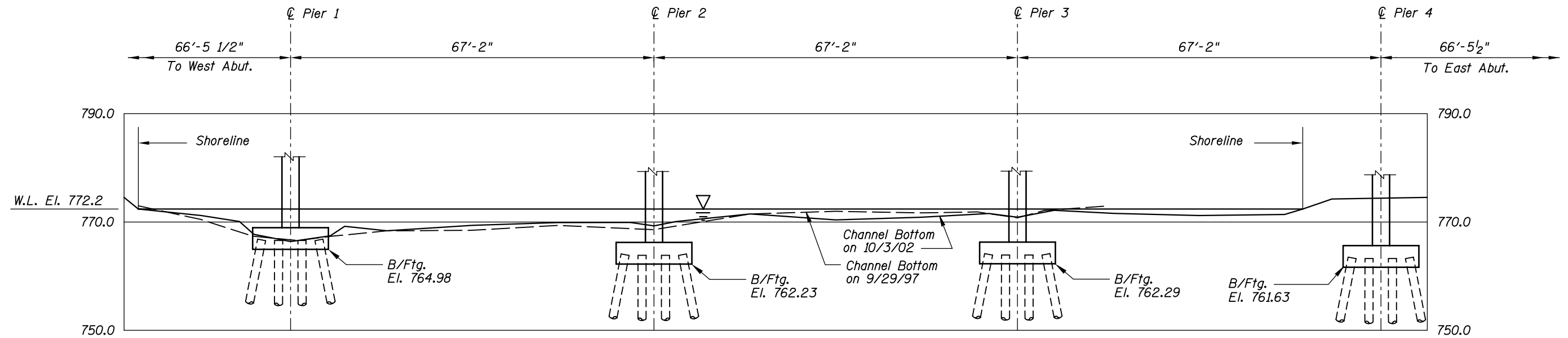
**TYPICAL END VIEW OF PIERS**

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

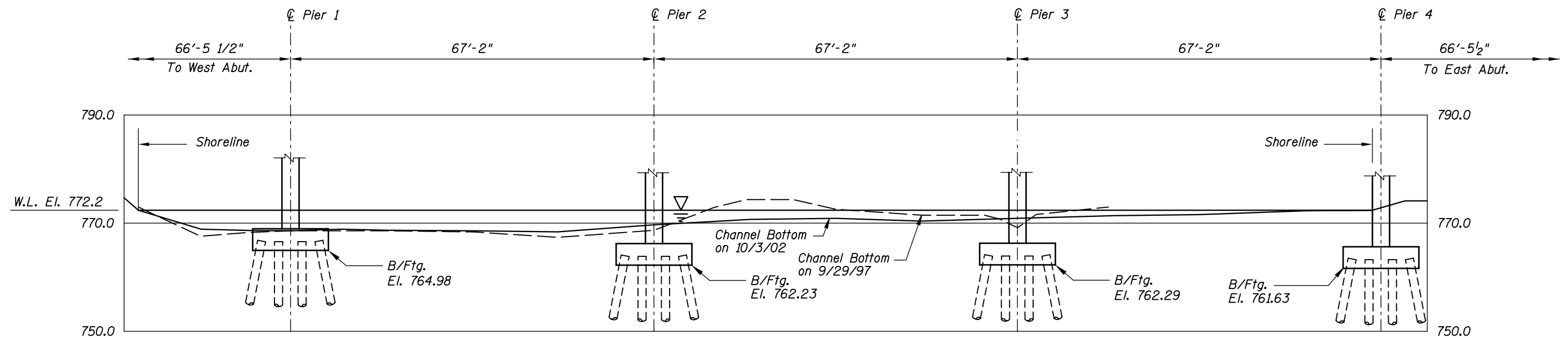
STRUCTURE NO. 23513  
OVER THE ROOT RIVER  
DISTRICT 6, FILLMORE COUNTY

**INSPECTION AND SOUNDING PLAN**

Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35I20I48		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 23513  
OVER THE ROOT RIVER  
DISTRICT 6, FILLMORE COUNTY  
**UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES**

Drawn By: PRH  
Checked By: MDK  
Code: 35120148

**COLLINS ENGINEERS, INC.**  
300 W. WASHINGTON, STE. 600  
CHICAGO, ILLINOIS 60606  
(312) 704-9300

Date: OCT. 2002  
Scale: 1"=20'  
Figure No.: 2





Photograph 1. Overall View of the Structure, Looking South.



Photograph 2. View of Pier 1, Looking Southwest.





Photograph 3. View of Pier 2, Looking Southwest.



Photograph 4. View of Pier 3, Looking Southeast.





Photograph 5. View of Pier 4, Looking Northeast.



Photograph 6. View of Timber Debris at Pier 3, Looking Southwest.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc.

DATE: October 3, 2002

ON-SITE TEAM LEADER: Shirley M. Walker, P.E.

BRIDGE NO: 23513

WEATHER: Cloudy, " 50° F

WATERWAY CROSSED: The Root River

DIVING OPERATION: ☒ SCUBA

☐ SURFACE SUPPLIED AIR

☐ OTHER

PERSONNEL: Clayton G. Brookins, Michelle D. Koerbel

EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 1:50 P.M.

TIME OUT OF WATER: 2:10 P.M.

WATERWAY DATA: VELOCITY " 1.5 f.p.s.

VISIBILITY " 3 feet

DEPTH 6 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 Through 4

REMARKS: Overall, the concrete of the piers was in good and sound condition with no structurally significant defects observed. Minor scour depressions were observed at Piers 1, 2 and 3. The top of the footing was exposed around the perimeter of Pier 1 with up to 3.2 feet of vertical face exposure at the upstream end. A minor accumulation of timber debris was observed at Piers 2 and 3. The channel bottom appeared stable with only minor local scour at the piers and no appreciable changes since the previous.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES ☒ NO

Monitor the timber debris at Piers 2 and 3, and if found to be increasing in the future, removal operations may become warranted.

Since scour screening indicated that bridge is at low risk for scour, only monitor the footing exposure and extent of scour during future inspections.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 23513  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Root River

INSPECTION DATE October 3, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL (REINFORCING)	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	6.0'	N	8	8	9	N	8	6	N	N	8	6	8	N	N	9	N	N
	Pier 2	3.5'	N	8	N	9	N	8	7	N	N	7	7	8	N	N	9	N	N
	Pier 3	2.0'	N	8	N	9	N	8	7	N	N	7	7	8	N	N	9	N	N
	Pier 4	0.3'	N	8	N	9	N	8	N	N	N	8	8	8	N	N	9	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the piers was in good and sound condition with no structurally significant defects observed. Minor scour depressions were observed at Piers 1, 2 and 3. The top of the footing was exposed around the perimeter of Pier 1 with up to 3.2 feet of vertical face exposure at the upstream end. A minor accumulation of timber debris was observed at Piers 2 and 3. The channel bottom appeared stable with only minor local scour at the piers and no appreciable changes since the previous.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.